DOCUMENT RESUME

ED 471 682 PS 030 843

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| AUTHOR | Schunk, Dale H.; Miller, Samuel D. |
| TITLE | Self-Efficacy and Adolescents' Motivation. |
| PUB DATE | 2002-00-00 |
| NOTE | 25p.; In: Academic Motivation of Adolescents. Adolescence and Education Series; see PS 030 841. |
| AVAILABLE FROM | Information Age Publishing, Inc., 80 Mason Street, Greenwich, CT 06830. Tel: 203-661-7602; Fax: 203-661-7952; Web site: http://www.infoagepub.com. |
| PUB TYPE | Information Analyses (070) |
| EDRS PRICE | EDRS Price MF01 Plus Postage. PC Not Available from EDRS |
| DESCRIPTORS | Academic Failure; *Adolescent Attitudes; Adolescent Development; *Adolescents; Beliefs; Intervention; *Learning Motivation; Parent Influence; Peer Influence; *Self Efficacy; *Social Cognition; *Student Motivation; Teacher Influence; Theories |
| IDENTIFIERS | Ethnic Differences |

ABSTRACT

Adolescence involves multiple academic changes and increased challenges with potential dramatic effects on student motivation and learning. This chapter focuses on the influence of one motivational process, perceived self-efficacy. The chapter provides background information on self-efficacy related to the larger theoretical framework of human action: social cognitive theory. The bulk of the chapter examines the academic self-efficacy beliefs of adolescents, tracing current research findings on self-efficacy beliefs, the key roles played by significant persons in the adolescent's environment, and interventions designed to improve self-efficacy. The chapter explains how judgments of capability for learning or performing behaviors at designated levels are powerfully related to the academic success that students experience, as well as to other motivation constructs and processes. Throughout the chapter, references are made to challenges to adolescents' self-efficacy that can negatively affect motivation, focusing on how students respond to failures and how teachers can help them "bounce back" from academic setbacks. (Contains 70 references.) (KB)

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CHAPTER 2

# SELF-EFFICACY AND ADOLESCENTS' MOTIVATION

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Cedric, an African American adolescent at a lower-achieving high school, wants to do well in school so that he will be accepted to a prestigious university where he can study engineering. Overall, he has been able to get average grades by simply memorizing information, but he recently sensed a need to change his studying approach after he failed two quizzes in biology. With the help of his teacher, he now attempts to identify the most important course information and organize it by relating it to what he knows. Cedric informs his teacher how excited he is about his new approach and how interested he is in the course's content. For the first time, he feels challenged at school and wonders if he should switch his college major to biology. As Cedric studied for his final exam, he was confident that he would make at least a B+. He was shocked when he failed the exam with a score of 45. He quickly lost his confidence and enthusiasm for biology. As he reflected on his grade, he thought, "This course is getting old—I'm tired of it."

*Adolescence*—the period from puberty to the early twenties—is a time when individuals undergo many cognitive, social, emotional, and physical changes. There are multiple academic changes and increased challenges arising largely from the transitions from one school level to the next (e.g., elementary to middle/junior high school, high school to college). These transitions can have dramatic effects on student motivation and learning, as is seen in the opening scenario.



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Current views conceptualize motivation as a dynamic and complex phenomenon comprising many cognitive, affective, and social processes that instigate, direct, and sustain action (Pintrich & Schunk, 2002). Key motivational processes include goals, expectations, attributions, values, emotions, and peer group dynamics. These processes, alone and in combination, influence students' perceptions of which academic disciplines are the most interesting and perhaps worthwhile studying. We see many of these processes at work in Cedric as he attempted to improve his biology grades.

In this chapter, we focus on the influence of one motivational process. *Perceived self-efficacy* refers to beliefs about one's capabilities to learn or perform behaviors at designated levels (Bandura, 1986, 1997). Much research shows that self-efficacy influences motivation across such varied domains as academics, sports, social relations, and health (Bandura, 1997).

We initially provide background information on self-efficacy to show its relation within a larger theoretical framework of human action: social cognitive theory. The bulk of the chapter discusses research on self-efficacy to include its operation in different contexts, developmental changes in self-efficacy, the key roles played by significant persons in adolescents' lives (parents, teachers, peers), and interventions designed to improve self-efficacy. The chapter concludes with suggestions for future research.

Throughout this chapter, we refer to the challenges to adolescents' self-efficacy that can negatively affect motivation, as exemplified in the scenario with Cedric. More specifically, we focus on how students like Cedric respond to failures and what teachers might do to help them "bounce back" from academic setbacks. Although a negative sense of self-efficacy affects behavior across the life span (Bandura, 1997), adolescents seem especially vulnerable given the constellation of academic, social, and physical changes. It is important that those who interact with adolescents recognize symptoms of low self-efficacy and work with students to strengthen their sense of competence.

## THEORETICAL BACKGROUND

### Social Cognitive Theory

Self-efficacy is a key mechanism in the framework of *social cognitive theory*. According to Bandura (1986, 1997), human achievement involves reciprocal interactions between one's behaviors, environmental variables, and cognitions and other personal factors (e.g., affects). In this view, self-efficacy (a personal factor) affects one's behaviors and the environments with which one interacts, and is itself influenced by actions and conditions.

For example, research shows that self-efficacy beliefs influence such student behaviors as task choice, persistence, effort, and achievement (Schunk, 2001). In turn, students' behaviors modify their self-efficacy beliefs. As students engage in tasks, they note progress toward learning goals. Perceptions of progress convey to students that they are capable of performing well, which enhances their self-efficacy for continued learning.

The interaction between self-efficacy and environmental conditions has been demonstrated in research on students with learning disabilities, many of whom lack self-efficacy for performing well (Licht & Kistner, 1986). As an example of how a personal factor (self-efficacy) can affect the environment, consider what happens when teachers believe that students lack skills and self-efficacy. They may give them easier tasks to work on or more assistance. In turn, teacher feedback (environmental condition) affects self-efficacy. A statement such as "I know that you can do this" can raise self-efficacy. The teacher in the opening scenario used such statements to counteract the negative effects on Cedric's self-efficacy of test feedback, an environmental variable.

Behaviors and environments influence each other. Cedric's teacher attempted to improve his self-efficacy by meeting with him to explain how to take lecture notes and how to improve his text understanding with a content area comprehension strategy. Her assistance had an immediate positive effect on his performance and attitude. He became more attentive in class and participated more frequently in class discussions. Based on his enthusiasm, the teacher demonstrated the strategy to her other students and posted its steps on a bulletin board for everyone to review. Both Cedric and his teacher were reinforced by each other's successes.

A major advance of social cognitive theory over earlier reinforcement theories is its emphasis on *vicarious learning*. Much human learning occurs without observers actually performing the behaviors learned, such as by observing others, attending to instruction, reading, watching television and videos, and networking via the Internet. Vicarious actions accelerate learning and save us from many unpleasant consequences. For example, Cedric does not have to drop out of school to appreciate the long-term career limitations of not having a college degree. He frequently receives this message verbally from his parents and older siblings.

By observing models (e.g., classmates, teachers, parents, siblings), students acquire knowledge that they may not demonstrate at the time of learning (Schunk, 2001). In our scenario, Cedric asked for assistance and then his teacher modeled a content area reading strategy for him to observe; he later watched the teacher demonstrate the same strategy to his classmates. Initially, Cedric and several of his friends were hesitant to try the strategy until they watched others use it. As he tried the strategy when reading a chapter in his text, he received feedback about his early

attempts. While his early successes were encouraging, teachers need to understand how long it takes for students to acquire the ability to use any strategy (Miller & Meece, 1999; Schunk, 2001). Teachers need to check frequently through questioning and assignments (actual performances) to see how well their students understand course content and to gauge how independently they can use various reading strategies. Teachers then can intercede to provide corrective feedback.

## Self-Efficacy

Self-efficacy refers to one's perceived capabilities for accomplishing a task. Self-efficacy is a situationally specific construct. It is meaningful to speak of self-efficacy for reading a textbook chapter, writing a lab report, solving an algebraic equation, learning to speak French, rebuilding automobile engines, high jumping, playing the saxophone, and so forth. Self-efficacy contrasts with more general measures such as self-concept and self-esteem, which involve general appraisals based on accumulated experiences across multiple sources (Pajares & Schunk, 2001).

Self-efficacy is hypothesized to affect task choice, effort, persistence, and achievement (Bandura, 1986, 1997; Schunk, 1995). Compared with students who doubt their learning capabilities, those who feel efficacious for learning or performing a task participate more readily, work harder, persist longer when they encounter difficulties, and achieve at a higher level. Self-efficacious students also bounce back more rapidly from failures, with corresponding benefits for motivation and achievement. Unfortunately, Cedric's self-efficacy has not reached a point where his teacher can expect him to recover quickly from a low test score.

Learners obtain information to appraise their self-efficacy from their actual performances, vicarious (observational) experiences, forms of persuasion, and physiological reactions. Students' own performances offer the most reliable guides for gauging self-efficacy; effects of the other sources are more variable. Successes raise self-efficacy and failures lower it, although an occasional failure is unlikely to have much impact on a strong sense of self-efficacy. Since Cedric did not have a strong history of prior successes in biology, his test failure immediately lowered his self-efficacy.

Learners acquire self-efficacy information from knowledge of others through social comparisons. Similar others offer the best basis for comparison. Students who observe similar peers learn a task are apt to believe that they also can learn it. This form of learning occurred when Cedric observed a friend using the content strategy with the teacher's guidance. He immediately said to himself, "If he can do it, I should be able to do the same." Vicariously derived information, however, typically has a weaker

impact than does performance information because the effects of the former can be negated by actual performance failures. Thus, while teachers need to know how to select students to act as models in their classrooms, they must make sure that all students understand the course's content and are becoming independent learners.

Persuasive information often comes in the form of encouragement from others (e.g., "You can do it!"). Such feedback can affect self-efficacy, although the effect will be transitory if subsequent performance turns out differently. Students also acquire efficacy information from physiological indicators (e.g., heart rate, feelings of anxiety). Experiencing anxiety or trembling may signal that one lacks skills and thus negatively affect self-efficacy. Cedric's teacher needs to attend to such signs as she attempts to help him strengthen his self-efficacy.

The effects of these sources on self-efficacy do not occur automatically; rather, information is cognitively weighed and appraised. In forming self-efficacy beliefs learners may use multiple factors, including perceptions of their abilities, past successes, task difficulty, effort expended, time persisted, amount of help received, perceived similarity to models, credibility of persuaders, and the type and intensity of emotional symptoms. Cedric is evaluating many factors in reappraising his self-efficacy.

Self-efficacy is not the only influence on learning and achievement. No amount of self-efficacy will produce competent performance when requisite skills and knowledge are lacking. *Outcome expectations*, or beliefs about the anticipated consequences of actions, are important because students engage in activities they believe will lead to favorable outcomes and shun those they perceive will have negative outcomes. *Perceived value* refers to the importance that learners attach to activities or how badly they desire certain outcomes (Wigfield, 1994). When students value an activity or its perceived outcome, they are apt to work at it even when they feel inefficacious about succeeding. Cedric's poor exam grade led him to question the value of performing well in biology. His outcome expectations also may have changed. He expected to receive better grades because of his new study behaviors, but now he is less certain about this outcome.

Achievement in any domain requires resilient self-efficacy; that is, individuals continue to feel efficacious even when confronted with difficulties and failures (Bandura, 1997). The lives of many prominent individuals are filled with multiple setbacks, especially when they were younger and not yet established in their professions (White, 1982). The resiliency of self-efficacy beliefs depends on how they were acquired, their strength, and the potency of disconfirming experiences (Bandura, 1997). People are most resilient to failures when they have a strong sense of self-efficacy developed largely through personal mastery experiences and when the setbacks they

experience are mild or occur infrequently. Hopefully, with his teacher's assistance, Cedric will be able to view this setback as temporary.

People with resilient self-efficacy are able to rebound quickly from difficulties and move forward. They assess the situation in which failure occurred and determine how they might perform better in the future, such as by changing strategies, seeking assistance, or altering dysfunctional environmental conditions. The *bounce-back* phenomenon is seen clearly in self-efficacious, high-achieving students who, after performing poorly on a test or assignment, redouble their efforts and again succeed. Conversely, when students like Cedric experience failure, they might expend less effort studying and their interest may recede. In such cases, teachers need to provide additional support and opportunities for success so that students might regain their confidence. Speed of bounce-back is one factor that distinguishes high achievers from low achievers.

## RESEARCH EVIDENCE

### Development of Self-Efficacy

Adolescents acquire much self-efficacy information from their homes, schools, and social environments. Home influences that promote effective interactions with the environment raise self-efficacy (Bandura, 1997; Meece, 1997). Parents who provide an environment that stimulates children's curiosity and allows for mastery experiences help to build their self-efficacy. These effects are reciprocal, because children who display more curiosity and exploration promote parental responsiveness (similar to what occurred between Cedric and his teacher).

Self-efficacy is aided when environments are rich in interesting activities that arouse their curiosity and offer reasonable challenges. There is much variability in home environments. Some contain computers, books, and puzzles that stimulate students' thinking. Parents heavily invested in their children's cognitive development spend time with them on learning. Parents also are key providers of self-efficacy information when they arrange for varied mastery experiences (Bandura, 1997). Other homes do not have these resources and adults may devote little time to the education of their daughters and sons.

With respect to nonperformance sources of self-efficacy information, parents who model effort, persistence, and ways to cope with difficulties strengthen children's self-efficacy. Parents who verbally encourage trying different activities and support these efforts develop children who feel more capable of meeting challenges (Bandura, 1997).

With development, peers become increasingly important (Steinberg, Brown, & Dornbusch, 1996). Parents who steer children toward efficacious peers increase the likelihood of vicarious boosts in self-efficacy. Peer influence on self-efficacy is enhanced by similarity. The effect of model similarity on observer self-efficacy is especially strong when observers encounter situations that demand new learning or behaviors. Similarity is potent among adolescents because peers are similar in many ways and teenagers are unfamiliar with many tasks.

Two important cognitive changes that occur with development are that capability self-beliefs become more specific and more accurate. Young students do not have differentiated conceptions of what they can and cannot do in various domains (Bandura, 1997). Depending on their early experiences, they may feel generally capable or incapable of accomplishing tasks. With development, students show less generality across domains and are able to make increasingly more accurate self-appraisals for learning or performing various tasks.

There are several reasons why self-appraisal skill improves. Young students have difficulty attending to models and tasks for long periods. With development, students are able to attend to multiple features of tasks simultaneously. They are less likely to be swayed by one distinguishing feature, such as how many numbers a problem contains or how many pages they have to read. They also are better able to derive cues about difficulty from models.

Cedric's ability and his classmates' abilities to appraise their learning have improved with development. They have the potential to use memory strategies, such as rehearsing and organizing information to be learned. Knowledge of strategies and when to employ them, and self-efficacy for working strategically, are key influences on learner's self-regulatory skill (Schunk, 2001). Moreover, students at this stage of development generally have a more extensive knowledge base to help them comprehend new information.

Students' ability to use social comparative information effectively depends on higher levels of cognitive development and experience in making comparative evaluations. Although students can evaluate themselves relative to others, they may not automatically do so and even when they do the comparisons may be based on superficial features rather than on those that determine performance (e.g., physical appearance rather than perceived skill). With development, comparisons shift from involving overt similarities and differences to a concern for factors that affect task performance (Ruble & Flett, 1988). For Cedric, the best comparisons are with peers he views as similar to himself in skill rather than ones based on ethnicity or gender.

Students also become more adept at discerning progress indicators. Most tasks involve multiple components, and it is common to learn some aspects but not others. Younger students can be easily misled into thinking they are efficacious when they can perform part of the task. In mathematics, for example, younger students may employ "buggy algorithms" that yield incorrect solutions (Brown & Burton, 1978). With development, self-assessment becomes more accurate as learners incorporate appraisals of their skills at performing multiple components.

The preceding paragraphs suggest that students like Cedric are at a stage in their development at which they have the potential to self-appraise their learning, to plan and study strategically, to use social comparison information effectively, and to discern improvements in their learning. What needs to be stressed, however, is how the potential for acquiring such skills does not develop in isolation. Unfortunately, in many schools, students have limited opportunities to acquire these cognitive skills because their teachers' instructional practices and curricular materials do not require such demonstrations (Bennett, DesForges, Cockburn, & Wilkinson, 1984; Goodlad, 1983; Miller, Adkins, & Hooper, 1993; Miller & Blumenfeld, 1993). Unless students have frequent opportunities to practice such skills, they cannot demonstrate the needed resiliency to overcome unavoidable academic failures.

## Academic Self-Efficacy

Self-efficacy researchers have examined the relation of self-efficacy to academic motivation (effort, persistence) and achievement. Self-efficacy and its resiliency are related directly to the strength of a student's motivation and achievement. Significant and positive correlations have been obtained between students' self-efficacy for learning (assessed prior to instruction) and subsequent motivation during learning (Schunk, 1995). Judgments of self-efficacy for learning also correlate positively with post-instruction self-efficacy and skillful performance (Schunk, 1995). Studies across different domains and with children and adolescents have yielded significant and positive correlations between self-efficacy and academic achievement (Lent, Brown, & Larkin, 1986; Multon, Brown, & Lent, 1991; Pajares, 1996; Schunk, 1995).

Bouffard-Bouchard, Parent, and Parivee (1991) found that high school students with high self-efficacy for problem solving displayed greater performance monitoring and persistence than did students with lower self-efficacy. Zimmerman and Bandura (1994) obtained evidence among college students that self-efficacy for writing correlated positively with goals for

course achievement, self-evaluative standards (satisfaction with potential grades), and actual achievement.

Multiple regression procedures have been employed to determine the percentage of variability in achievement accounted for by self-efficacy. Schunk (1982) found that self-efficacy and rate of problem solving during instruction (an index of motivation) accounted for significant increments in post-instruction academic achievement. Schunk and Swartz (1993a, 1993b) found that self-efficacy was the strongest predictor of children's writing performances. Pajares, Miller, and Johnson (1999) found that writing self-efficacy strongly predicted elementary children's writing performances; this finding also was obtained by Pajares and Valiante (1999) among middle school students. Shell, Murphy, and Bruning (1989) showed that self-efficacy predicted college students' reading and writing outcomes.

Several studies have tested causal models (Pajares, 1996). Using path analysis, Schunk (1981) showed that self-efficacy had a direct effect on mathematical achievement and persistence solving problems. Instruction had a direct effect on achievement and an indirect effect through persistence and self-efficacy. Instruction also had an indirect effect on persistence through self-efficacy. Schunk and Gunn (1986) also used path analysis and found that changes in students' mathematical achievement were due to use of effective learning strategies, self-efficacy, and attributions (perceived causes of outcomes).

Using path analysis, Pajares and Kranzler (1995) determined that mathematics self-efficacy has as powerful a direct effect on mathematics performance as does mental ability, a variable often presumed to be the strongest predictor of academic achievement. Pajares and Miller (1994) showed that mathematics self-efficacy was a better predictor of the mathematics performance of college undergraduates than were mathematics self-concept, perceived usefulness of mathematics, prior experience with mathematics, and gender. Using path analysis, Zimmerman and Bandura (1994) showed that self-efficacy affected achievement directly and indirectly through its influence on goals.

There is some research showing how students' perceptions of academic competence decline as they advance in school (Eccles, Wigfield, & Schiefele, 1998). This decline has been attributed to various factors including greater competition, more norm-referenced grading, less teacher attention to individual student progress, and stresses associated with school transitions (discussed below).

A different trend emerges for self-efficacy. Given its contextual sensitivity, we might expect that with development children's self-efficacy would increase. The standard school curriculum includes skills (e.g., reading, mathematical computations) that are taught and reintroduced in later

grades and that serve as the building blocks for advanced skills. As children move through school they gain experience with these tasks, which should raise their self-efficacy. In support of this point, researchers have shown that older students judge self-efficacy higher than do younger ones (Shell, Colvin, & Bruning, 1995; Zimmerman & Martinez-Pons, 1990).

Nonetheless, there are school practices that can retard the development of academic self-efficacy, especially among students who are less academically prepared to cope with increasingly challenging academic tasks. For example, lock-step sequences of instruction frustrate some students who fail to grasp skills and increasingly fall behind their peers (Bandura, 1997). Ability groupings can hurt self-efficacy among those relegated to lower groups. Classrooms that allow for much social comparison tend to lower the self-efficacy of students who find their performances inferior to those of their peers. Some research shows that self-efficacy—like more general perceptions of academic competence—declines as students advance in school (Pajares & Valiante, in press). It would be useful to examine Cedric's school environment to determine whether students at this low-achieving school receive negative self-efficacy information about what they can accomplish.

Periods of transition in schooling can cause changes in self-efficacy (Schunk & Pajares, 2002). A large amount of research has investigated the transition from elementary school to junior high (Eccles & Midgley, 1989; Eccles, Midgley, & Adler, 1984). Elementary school children have the same teacher for most subjects and are grouped with the same peers. Children receive a lot of individual attention and progress feedback. The curriculum is focused heavily on basic skill acquisition and mastery is stressed. Although peer social comparisons occur, teachers employ criterion-referenced grading.

The transition results in changes in many areas. Several elementary schools may feed into one junior high, so students are exposed to many new peers. They may or may not have a homeroom, but regardless, they have different peers in their various classes—many of whom they do not know. Evaluation and grading become normative, and teachers are less concerned with individual progress. Adolescents may frequently reassess their self-efficacy in various subjects given this shift to normative grading among unfamiliar peers. Research shows that general perceptions of academic competence begin to decline in grade 7 or earlier (Harter, 1996; Midgley, Feldhaufer, & Eccles, 1989; Wigfield et al., 1997), and a similar decline may occur in academic self-efficacy (Pajares & Valiante, in press).

The transition from middle school or junior high to senior high brings more changes, although these may prove less disruptive because students are used to changing classes, unfamiliar peers, and norm-referenced grading. At the same time, high school classes are more difficult and there is an

expanded pool of peers. In the face of these changes, adolescents like Cedric must reevaluate their self-efficacy in many domains and subject areas. We discuss the key roles played by peers in the next section.

## Social and Peer Influence

Adolescents' self-efficacy is strongly influenced in social settings by peers. Vicarious observations of others performing a task can raise observers' self-efficacy and lead them to believe that they too can accomplish it, whereas observing others failing can lower self-efficacy vicariously.

The strongest vicarious influence comes from others we perceive as similar to ourselves in key characteristics. In school, similarity might be based on perceived ability, grades, and ease or difficulty in learning. Similarity is especially critical when observers are unfamiliar with tasks and therefore lack performance experiences. When Cedric's teacher used of one of his friends as a model, his confidence in his abilities increased as well.

Key social sources of self-efficacy information are friends and *peer networks*, or large groups of peers with whom students associate. Students in networks tend to be highly similar (Cairns, Cairns, & Neckerman, 1989), which enhances the likelihood of influence by modeling. Networks help define students' opportunities for interactions and observations of others' interactions (Dweck & Goetz, 1978). Discussions between friends influence their choices of activities and friends often make similar choices (Berndt & Keefe, 1992).

Peer groups promote motivational socialization. Kindermann, McCollam, and Gibson (1996) found that changes in children's motivational engagement across the school year were predicted accurately by their peer group membership at the start of the year. Children affiliated with highly motivated groups changed positively; those in less-motivated groups changed negatively. These results suggest that peer group academic socialization influences the group's academic self-efficacy and motivation (Schunk & Pajares, 2002). Unfortunately, many of the peers with whom Cedric associates do not share his academic aspirations.

Steinberg and colleagues (1996) tracked students from when they entered high school until their senior year and found developmental patterns in the influence of peer pressure on academic motivation and performance, as well as many other activities. Peer pressure rises during childhood and peaks around grade 8 or 9 but then declines through high school. A key period of influence is between ages 12 and 16, during which parental involvement in adolescents' activities often declines.

Steinberg and colleagues (1996) investigated whether students who began high school with similar grades, but who became affiliated with dif-

ferent peer crowds, remained academically similar. Students in academically oriented crowds achieved at a higher level during high school than did students in less academically oriented crowds.

Another factor contributing to self-efficacy is how well students experience a sense of relatedness to the school environment. Hymel, Comfort, Schonert-Reichl, and McDougall (1996) suggested that students' involvement and participation in school depend in part on how much the school environment contributes to their perceptions of autonomy and relatedness, which in turn influence self-efficacy and academic achievement. Although parents and teachers can develop autonomy and relatedness, peers strongly affect adolescents' feelings of relatedness (i.e., belonging, affiliation).

## Interventions Affecting Self-Efficacy

Table 2.1 portrays a model of how self-efficacy operates in learning and achievement situations (Schunk & Pajares, 2002). At the outset of an activity, students differ in their self-efficacy for learning as a function of their prior experiences, personal qualities (e.g., abilities, attitudes), and social supports. The latter includes the extent that parents and teachers encourage them to learn, facilitate their access to resources necessary for learning (e.g., materials, facilities), and teach them self-regulatory strategies that enhance skill acquisition and refinement. Bandura, Barbaranelli, Caprara, and Pastorelli (1996) found that parents' academic aspirations for their children affected children's academic achievements directly and indirectly by influencing children's self-efficacy. This is a plus for Cedric, because his parents believe strongly in education and support his academic pursuits.

**Table 2.1. Self-Efficacy for Learning and Achievement (Schunk & Pajares, 2002)**

| *Pretask* | | *Task Engagement* | *Posttask* |
|---|---|---|---|
| Personal qualitites | | Personal influences | Motivation |
| Prior experience | Self-efficacy | | |
| Social supports | | Situational influences | Self-efficacy |

As students engage in activities, they are affected by personal (e.g., goal setting, information processing) and situational influences (e.g., rewards, teacher feedback). These factors provide students with cues about how well they are learning. Motivation and self-efficacy are enhanced when students perceive they are performing well or becoming more skillful. Lack of success or slow progress will not necessarily lower self-efficacy and motivation



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if learners believe they can perform better by adjusting their approach (e.g., expend more effort, use effective task strategies; Schunk, 1995). Cedric is giving serious thought to how he might adjust his studying based on the test feedback.

Research in diverse settings has explored the effects of instructional and other classroom processes on self-efficacy. There is strong evidence in support of the hypothesized relations shown in Table 2.1 across grade levels (e.g., elementary, middle/junior high, secondary, postsecondary), content areas (e.g., mathematics, writing, reading, computer applications), and types of students (e.g., regular, remedial, gifted) (Pajares, 1996; Schunk, 1995). Some instructional and other processes that are beneficial for developing self-efficacy are proximal and specific learning goals, strategy instruction and strategy verbalization, social models, performance and attributional feedback, and performance-contingent rewards (Schunk, 1983, 1984, 1995; Schunk, Hanson, & Cox, 1987; Zimmerman, Bandura, & Martinez-Pons, 1992). These different processes are hypothesized to affect self-efficacy and motivation through the common mechanism of informing students of their capabilities and progress in learning. We now illustrate some interventions designed to promote academic self-efficacy.

*Goal setting* is a key cognitive influence on self-efficacy (Bandura, 1997). When students set or adopt a goal they may experience a sense of self-efficacy for attaining it and make a commitment to try. They work at activities they believe will lead to goal attainment (e.g., attend to instruction, remember information, expend effort and persist). Self-efficacy is substantiated as they observe goal progress. Goals that are specific, close at hand, and moderately difficult enhance self-efficacy because motivation is higher and assessing progress is clearer than when goals are general (e.g., "Do your best"), temporally distant, and very easy or overly difficult. Cedric has a long-term goal of attending a university, and has broken this into subgoals of academic attainments needed for it. Providing students with feedback on goal progress also can raise self-efficacy, sustain motivation, and promote learning.

Most goal-setting research has employed product goals, such as number of pages to read, problems to solve, and time to complete a task. Goals also can be cast in the form of learning processes, such as learning to apply a method or strategy to aid skill acquisition. Research across domains shows that students who learn strategies improve their skills and that use of strategies relates positively to self-efficacy (Pintrich & De Groot, 1990; Zimmerman & Martinez-Pons, 1990).

Process goals (e.g., learn to use a strategy) may enhance self-efficacy and achievement better than product goals because process goals highlight strategy use as a means to improve skills. Students may experience a sense of self-efficacy for attaining the goal, which then is substantiated as they

work on the task. Learners who believe they are learning a useful strategy feel efficacious and motivated to apply the strategy (Schunk, 1995). Cedric's teacher might help him to bounce back from his test failure by helping him to set several specific goals related to more consistent use of his new study strategies.

In a series of studies, Schunk and Swartz (1993a, 1993b) gave students instruction and practice over sessions on writing different types of paragraphs (e.g., informative, narrative). As part of the instruction, students were taught a paragraph-writing strategy. Some students were asked to adopt a product goal of writing paragraphs, others were given a general goal of doing their best, and those in a third condition received a process goal of learning to apply the strategy while writing paragraphs.

Some of the process-goal learners also periodically received feedback indicating their progress in using the strategy effectively. This condition was included because assessing progress toward a process goal can be difficult since the progress indicators for product goals (work completed, time spent) are not applicable.

Schunk and Swartz (1993a, 1993b) found that process goals and progress feedback promoted self-efficacy, achievement, strategy use, and maintenance and generalization of achievement outcomes more than did product and general goals, and that on some measures the combined condition performed better than the process goal condition. These results show the benefit of process goals and suggest that progress feedback may be important only when students have difficulty gauging progress on their own.

*Models* are an important source of self-efficacy information. Adolescents acquire much vicarious information from parents, teachers, and peers. Modeled displays can convey to observers that they are capable and can motivate them to attempt the task. Modeling is a common means of teaching skills in school; a teacher or peer may demonstrate and explain a skill, after which students practice and receive corrective feedback as needed (Schunk, 1987).

Research demonstrates the benefits of models on adolescents' self-efficacy, motivation, and achievement. Brown and Inouye (1978) asked college students to judge self-efficacy for solving anagrams, after which they attempted to solve them. Following the problem solving, students were told that they had performed better than or the same as a model. They then observed a model fail, judged self-efficacy, and again attempted to solve anagrams. Telling students they were more competent than the model led to higher self-efficacy and persistence than telling them they were as competent as the model.

Schunk and Hanson (1985) compared the effects on upper-elementary students of observing peer mastery and coping models with those due to showing adult teacher models and effects due to not observing models.

Peer mastery models solved math problems correctly and verbalized statements reflecting high self-efficacy and ability, low task difficulty, and positive attitudes. Peer coping models initially made errors and verbalized negative statements, but then began verbalizing coping statements (e.g., "I need to pay attention to what I'm doing") and eventually verbalized and performed as well as mastery models. After observing models, students received instruction and practice solving problems over sessions. Following instruction, they judged self-efficacy and took an achievement test.

Peer models increased observers' self-efficacy and skill better than the teacher model and no model; teacher model students outperformed students not exposed to models. There were no differences between the mastery and coping conditions. Schunk and Hanson (1985) hypothesized that coping models would be more effective than mastery models because students had previously had difficulty with math and may have viewed the coping models more similar to themselves than the mastery models. Students in this study had, however, experienced some prior successes in math, and may have based their efficacy beliefs on these previous successes.

A follow-up study used a similar methodology but a mathematical task at which students had previously experienced few successes (Schunk et al., 1987). This study also tested the idea that multiple models are better than a single model, because multiple models increase the likelihood that students will view themselves as similar to at least one model (Schunk, 1987). The results showed that multiple models—coping or mastery—promoted achievement outcomes as well as a single coping model and better than a single mastery model. Learners who observed a single coping model judged themselves more similar in competence to the model than did those who observed a single mastery model. Thus, similarity seems more important when students have few other cues for gauging self-efficacy.

Students learn from many models, including parents and teachers who are dissimilar in age, gender, competence, socioeconomic status, and other attributes. They also weigh and combine efficacy information from diverse sources. Multiple sources may yield conflicting information; for example, a student may be told by a teacher that "You can do it," but then observe a similar peer fail. The process by which students assimilate such conflicting information requires further research study.

We noted earlier that *feedback* can influence self-efficacy. Feedback is a persuasive source of self-efficacy information. Attributional feedback links students' successes and failures with one or more attributions (perceived causes of outcomes). Performance feedback informs students of how well they are doing. Progress feedback provides information about progress toward learning goals.

Research conducted with students of different ages and across content areas has yielded results that show beneficial effects of feedback on self-efficacy, motivation, and achievement (Schunk, 1995). In the absence of feedback, students may wonder whether they are becoming more capable, especially when it is difficult to obtain performance information on their own. Lack of feedback can retard the development of self-efficacy. Although Cedric's feedback was negative, it is information and he can use it to adjust his future studying.

Schunk and Lilly (1984) exposed middle school girls and boys to a novel mathematical task. Girls initially judged self-efficacy for learning lower than did boys, which is consistent with much research on gender differences in self-efficacy (Pajares, 1996; Schunk & Pajares, 2002). Following an instructional program that included performance feedback, girls and boys did not differ in actual achievement or in self-efficacy for solving problems. There also were no differences in male and female students' problem solving during the instructional program. The performance feedback indicated that learners were successfully acquiring skills, which was sufficient to override any preconceptions the girls might have had from prior experiences with mathematical tasks.

Feedback also is influential among students with learning difficulties. Schunk and Cox (1986) worked with students with learning disabilities during mathematics instruction. Some students received feedback linking their successes with effort ("You got it right; you've really been working hard."). Half of these students received effort feedback during the first half of the instructional program, whereas the other half received it during the second half. Schunk and Cox wanted to determine whether effort feedback becomes less credible—and therefore loses its effectiveness—as students developed skills and thus had to work less hard to succeed.

The results showed that each type of feedback promoted self-efficacy, motivation, and achievement better than no feedback. First-half feedback increased students' effort attributions for success and motivation during the first half of the program. Given students' learning disabilities, effort feedback for early or late achievement likely seemed credible because these students had to work diligently to succeed. Students may have interpreted the feedback as indicating that they were becoming skillful and capable of further learning. With students who learn more rapidly, shifting to feedback indicating developing skill or ability as instruction proceeds may be viewed as more credible and thus better promote achievement outcomes.

## FUTURE RESEARCH

We have shown that self-efficacy is a key process among adolescents that affects motivation and achievement. At the same time, we sound the obvious call for more self-efficacy research with adolescents. In particular, we believe the following areas to be germane, and the results would have theoretical and practical significance.

### Generality of Self-Efficacy

Research is needed on the extent to which self-efficacy beliefs generalize from one domain to another and whether such generalization varies as a function of adolescent development. Given that self-efficacy is conceptualized as a domain-specific construct (Bandura, 1997; Pajares, 1996), most self-efficacy researchers have not determined whether it generalizes across domains. There is limited evidence for generalization (Smith, 1989).

For any given content, students' self-efficacy for learning is affected by their aptitudes, prior experiences, and social supports (Schunk, 1995; see Table 2.1). Learners who typically perform well in a content area should have higher self-efficacy for learning new content than those who have had learning difficulties. Self-efficacy might generalize to the extent that the new domain builds on prior skills (e.g., self-efficacy for solving algebraic equations may affect self-efficacy for learning calculus).

Generalization also might occur across dissimilar domains if students believe that the domains share skills. For example, students who feel efficacious about writing term papers and believe that writing term papers and preparing science lab reports involve planning and organizing may have high self-efficacy for performing well on their first science lab report. We might expect that generalization would increase with cognitive development and experience because older students could determine the prerequisites of the new domain and draw on prior knowledge.

Researchers also need to examine the extent to which some academic tasks might facilitate generalization more so than do others. Miller and Meece (1997, 1999) found that students' confidence in their learning abilities and a preference for challenging academic tasks increased when they had frequent and regular opportunities across the entire school year to read and write complex prose while studying collaboratively with classmates over extended time periods. Students' self-efficacy might become more resilient and generalize to other domains more easily if students like Cedric are challenged by their teachers to achieve at their highest optimum levels.



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## Self-Efficacy Outcomes

Future research needs to investigate how well self-efficacy predicts achievement outcomes as a consequence of development. Bandura's (1986) contention that self-efficacy influences choice of activities, effort, and persistence is seen most clearly in contexts in which behavior reflects performance of learned skills (e.g., engaging in feared activities). In academic settings, the influence of self-efficacy on these indexes is complex.

Choice of activities often is not a good index because students do not choose many of the learning activities in which they engage. Persistence also presents problems. Students typically persist on activities not because of high self-efficacy, but rather, because the teacher keeps them on task. Educational research has yielded inconsistent results on the relation of self-efficacy to persistence (Schunk, 1995). A positive relation may be found in the early stages of learning when greater persistence leads to better performance. As skills develop, students should require less time to complete the same task, which means that self-efficacy will relate negatively to persistence. At higher grade levels, students often are required to complete tasks that take longer and require much persistence with minimal supervision (e.g., write a 10 page research paper), so we would expect that self-efficacy and persistence would relate directly. With development, adolescents are better able to determine how much persistence may be necessary to succeed. Thus, self-efficacy may predict persistence better at the higher grades, but this issue needs to be explored.

Research during learning also is needed on effort, which seems promising as a key motivational outcome linked to self-efficacy. Subject content increases in difficulty as students proceed through school, which means that greater effort is required to sustain the same level of success. Research has obtained positive relations between self-efficacy and cognitive effort (Corno, 1993; Salomon, 1984). We recommend that a longitudinal study be conducted during which students' careers are traced to determine how the self-efficacy/effort relation changes with development and with increased subject difficulty. Such an effort would help teachers to understand how they might promote self-efficacy and achievement with students, like Cedric, who lack the necessary persistence to recover from unexpected failures.

## Multiple Influences on Self-Efficacy

We noted earlier that sources of self-efficacy often conflict. Students may work on a task and encounter difficulty, but observe peers succeeding and be encouraged by a teacher. In social settings, they may experience anxiety



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and doubt that they can interact effectively with peers, but observe peers mixing well. Clearly we need more research on how students weigh and combine sources of self-efficacy information, and how behavior varies when conflicts result. A longitudinal study would allow researchers to study how self-efficacy develops in actual classrooms where students constantly face many challenges. Certainly Cedric's self-efficacy did not develop incrementally in any predictable manner. Some days, he was at a loss for what he might do in a particular subject to improve his grades; at other times, he approached his studies with enthusiasm and confidence. We would think that his self-efficacy fluctuated as he experienced many successes and failures throughout his different classes. A longitudinal study would provide critical insights into how self-efficacy develops within and across various academic domains.

It is true that peer pressure or the overarching desire to do something can lead to action even in the face of low self-efficacy. Students may try out for sport teams not because they feel confident about performing well but rather because they want to be part of the athletic crowd. Students may take difficult courses not because they feel efficacious about succeeding, but rather because their parents are encouraging them to be on the college track and want them admitted to a prestigious university. Self-efficacy may bear little relation to behavior under these circumstances, but research is needed.

## Self-Efficacy and Ethnicity

More self-efficacy research is needed on diverse ethnic populations. Graham (1994) found that African American students maintain optimism and positive self-regard in the face of social and economic disadvantage, and that the academic self-beliefs of African Americans are strong even in the face of achievement failure (and often stronger than those of their white peers). Similar findings have been reported with Hispanic American samples (Lay & Wakstein, 1985; Stevenson, Chen, & Uttal, 1990).

These findings are primarily from studies measuring generalized competence beliefs. When the belief assessed is task-specific self-efficacy, results can differ. Pajares and Kranzler (1995) found that mathematical self-efficacy of African American students was lower than that of whites; Pajares and Johnson (1996) showed that writing self-efficacy of Hispanic high school students was lower than that of white students. In each case, minority students reported positive math self-concepts. It may be that minority students hold different beliefs as a function of specificity of assessment (Edelin & Paris, 1995).

It is possible that socioeconomic conditions influence self-efficacy differently among ethnic groups. Bandura (1986, 1997) observed that when social and economic systems are prejudicial, students may find that no amount of effort will cause desired outcomes. Minority adolescents may possess the confidence and skill required to achieve but may choose not to because they lack the incentives (Ogbu, 1992; Steele, 1997). Self-efficacy may also be unrelated to achievement in schools where teachers, equipment, or resources required to help students perform academic tasks are inadequate (Schunk & Pajares, 2002). Studying Cedric's school environment would be useful to determine whether it is aiding or suppressing development of self-efficacy for learning.

Bandura (1997) also suggested that self-efficacy may exceed actual performance when social constraints and inadequate resources impede academic performances; students are unable to do what they know. This observation helps shed light on findings regarding the competence beliefs of minority students in some contexts. There is a need to explore the role that schools play as social systems in developing and cultivating self-efficacy as well as the effects of these systems' incentives on students' self-efficacy.

## CONCLUSION

Adolescents' self-efficacy beliefs affect the instigation, direction, persistence, and outcomes of achievement-related actions. In this chapter, we traced how self-efficacy changes with development and elucidated variables that affect this change. We used Cedric as an example in the opening scenario to underscore the complexities associated with studying self-efficacy in classrooms in which the number of influential variables far exceeds those found in more structured research environments. Some of these variables may promote self-efficacy in some situations while undermining its development in others A greater understanding of how such variables operate in classrooms will help teachers to address the challenge of how to increase the learning and motivation of all students. Cedric's unique challenges call attention to the problems faced by students as they attempt to successfully negotiate obstacles to their successful classroom learning. Consistent with this focus, we suggested profitable areas of research. The future should provide greater clarification of the operation of self-efficacy in different domains and highlight ways that self-efficacy can be enhanced in learners across developmental levels.



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